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HABITS OF THE TRINIDAD GUAPIN, *RIVULUS HARTI* (BOULENGER)

I have received from Robert Anderson and Gerald A. Waring, Stanford mining engineers, several specimens of the little Top-Minnow, *Rivulus harti* (Boulenger), from rock pools in the island of Trinidad.

Mr. Anderson writes: "The other day when Waring and I were tramping through the 'high woods,' the beautiful tropical forest in the Southern Range of Trinidad, we were astonished to find little fishes swimming in a pool of water, in a pit about a foot and a half deep which one of our geologists had dug two months previously, on a hill slope in the forest. We caught a number of them, thinking they would interest you, and are sending them to you. They are probably the same as a common species in the streams, but the occurrence is interesting as an illustration of distribution and the quick utilization of a fortuitous rain-pool in the dry season. The pit is a third of a mile away from the nearest running stream (the Guapo 'River') and I would say at least seventy-five feet above it. It is about sixty feet away from and twenty feet above a small ravine that would have running water during periods of heavy rain, and doubtless small pools lasting weeks or possibly months thereafter, but which was dry in this neighborhood at the time of our visit. The so-called 'dry season' lasts from about January to April, but rain showers are apt to occur every few days. The soil is almost always moist when one digs into it, but pools of water are seldom

seen away from main drainage lines in this region of low forested hills, except where there is an artificial excavation.

"The location of the pit is in Southwestern Trinidad, about five miles southwest of the Pitch Lake and three and a half miles southeast of Point Fortin."

This little fish is very tenacious of life and has been known to wander from pool to pool through wet grass after rains.—DAVID STARR JORDAN, *Stanford University, Calif.*

NOTES ON FISHES FROM APIA, SAMOA

In 1921, Miss Mary E. McLellan, assistant, department of Ornithology and Mammalogy, California Academy of Sciences, spent some time at Apia, Samoa, where she made small collections of birds, mollusks, fishes, etc., for the Academy's Museum.

In the collections are six specimens of fishes obtained September 17, 1921, in a small stream at Apia by Captain Tim Tate who kindly turned them over to Miss McLellan who generously donated them to the California Academy of Sciences. They have been placed in the ichthyological collection of the Steinhart Aquarium which is under the management of the Academy. These specimens have been identified as follows:

1. *Caranx sexfasciatus* (Quoy and Gaimard)

Two specimens (Nos. 73 and 74, Steinhart Aquarium), 5.5 inches long. Head 3.2; depth 2.9; eye 3.2; snout 4; D. VIII-I, 20; A. II-I, 16; scutes 32. Lateral line with a moderate curve, becoming straight under fifth dorsal ray; breast fully scaled. Teeth in jaws, and on vomer, palatines and tongue, those in the jaws in a single series except anteriorly where there is an outer row of large teeth in the upper jaw; maxillary extending to below posterior margin of pupil, its length 2 in head, its distal width equal to pupil; pectoral long and falcate, the length equal to or exceeding that of head.

Color in alcohol, dull yellowish gray; anal fin lemon-yellow; pectoral uncolored, dorsal and caudal grayish; a dark opercular spot.

2. *Kuhlia marginata* (Cuv. and Val.) Salele; "Perch"; "Trout."

One specimen (No. 72, Steinhart Aquarium), 5.25 inches long, taken by Capt. Tim. Tait at Apia Upopu. Head 3.4; depth 2.9; D. IX-I, 11; A. III, 12; scales 42; eye 3 in head and equal to interorbital width.

Tenth dorsal spine much longer than ninth, the fifth less than 2 in head and longer than longest dorsal rays. Snout shorter than eye; maxillary reaching to below anterior third of eye, its length 2.2 in head; gillrakers 34 on lower limb; caudal forked, the lobes acute.

Color in alcohol, grayish, mottled with lighter spots above, white below middle of sides; soft dorsal, caudal and anal with dark margins; axil of pectoral dark.

3. *Terapon servis* (Bloch)

Three specimens (Nos. 75, 76, and 77, Steinhart Aquarium), 6.5 to 7 inches long. Head 3; depth 3; D. XI-I, 10; A. III, 8; eye 3.5 in head, slightly less than interorbital width; scales 12-81-23; snout 3.7 in head. Opercle with a strong spine; preopercle strongly toothed; maxillary extending to below anterior third of eye, its length 2.8 in head. Small sharp teeth in jaws, vomer and palatines.

Color in alcohol, greenish gray, with three distinct curved brown stripes with the convexity toward belly; caudal with 2 oblique dark stripes.—Barton Warren Evermann *and* Alvin Seale, *San Francisco, Calif.*

A METHOD OF PREPARING REPTILE PENES

While engaged in a revision of a genus of snakes, it was found necessary to make careful examination of penial characters. Various methods of preparation of the penes were tried, such as stuffing them with absorbent cotton, injecting with hot gelatin, one hun-

dred percent formalin, and other fluids, but none of these methods was succesful. The method given below has been used for some months and has proved very satisfactory.

Both of the organs are everted as much as possible by rubbing with considerable pressure, forward toward the anal plate, from a point about one-third of the way from the anal plate to the tip of the tail. While they are held partially everted, a deep transverse incision is made across the ventral side of the tail, about ten scutes posterior to the anus, and the two muscles which hold the penes are cut. These muscles are large and cylindrical, and lie parallel to the vertebral column. The penes can now easily be pushed forward and should be fully everted.

Each organ is now punctured near the base with a needle a little smaller than the one to be used for injection. Melted white beeswax, at a temperature somewhat higher than its melting point, is now drawn up into a previously heated syringe of about 50 to 60 cc. capacity. A high m. p. parafin, 58°, may be substituted. A large syringe is used because the pressure of injection must be maintained until the wax can harden, and often much will leak out around the needle, where it is inserted, before the wax can be hardened inside of the organ. Immediately after the melted wax is drawn up into the syringe, a small stream is kept flowing through the needle, so that it will not solidfy in it. The needle is now pushed through the previously made puncture, well up into the interior of the organ. By proper pressure on the plunger, the penis is filled with beeswax; then while the pressure is maintained, the organ is plunged into ice water. The needle may be removed in a very few seconds, but the snake should be left in the ice water two or three minutes, in order that the wax may become entirely hardened. It will now be noted that while the cavity in the organ is filled with hard beeswax, the tissue itself is still soft and flaccid. Because

of this fact, and because the spines do not stand out distinctly (especially when numerous and fine), only a fair preparation is the result. If the still attached penes are now taken from the ice water, and dipped into boiling water for five seconds, and then again put into ice water immediately, a very satisfactory preparation is obtained. After this final hardening of the wax, the penes can be cut away from the snake, and the tissue hardened further in 10 to 20 percent formalin for a few days, and then placed in 3 to 5 percent formalin for storage.

This same technique has also been used with success in injecting lizard penes, in particular those of large forms such as *Cyclura cornutum* and *C. ricordii*.

The method is one which requires a little practice and quick action. The results, however, are so far superior for the study of these most fundamental characters, that anyone working with them will feel well repaid for his efforts.—A. I. Ortenburger, *New York, N. Y.*

NOTES ON THE BEHAVIOUR OF THE WESTERN NEWT IN CAPTIVITY.

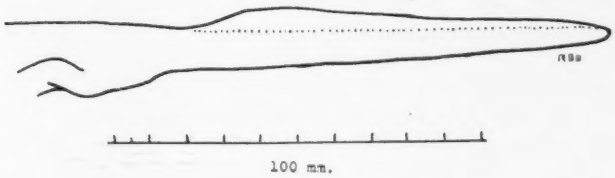
Two specimens of the western newt, *Notopthalmus torosus* (Eschscholtz) obtained from Baird, California, have been kept since April, 1921, in a terrarium 7 by 14 by 10 inches high together with specimens of *Ambystoma maculatum* (Shaw), *Ambystoma opacum* (Green), *Pseudotriton ruber ruber* (Sonnini) and *Notopthalmus viridescens* Rafinesque. On Sept. 20, 1922, seven specimens of *Salmandra salamandra* (Linn.) were added to the collection. All the specimens appeared to be uniformly healthy until, in the early part of December, 1922, one of the examples of *N. torosus* developed angry looking sores at the insertion of the hind limbs. Incidentally it was noted at this time that the sick individual kept as far away as possible from the more fortunate *torosus*. On De-

cember 28, the former died and measured at this time 133 mm. while the living one showed a length of 160 mm.

From January 4 to 29, 1923, hardly any attention was given the terrarium, until on the latter date, when some raw beef was about to be offered them, the following peculiarities were noted. A considerable change had come over the surviving specimen which was spread out in the center of the terrarium, while the other salamanders were hidden as far away from it as possible. As they were forced out of their corners, the *torosus* (seemingly gigantic in proportions) looked gloatingly around and snapped at a specimen of *S. salamandra* grasping it viciously by the end of the tail and while the latter wriggled and squirmed the newt made a further attack, at which point the writer interfered. The *S. salamandra* freed once more scrambled away and the *torosus*, seemingly disappointed snatched at other specimens grasping feet or tails as opportunity afforded. The appetite was immediately satisfied by a quantity of raw beef, this species taming readily and feeding fearlessly from the hand. It was then removed to another terrarium and measurements showed that the following remarkable increase in size had taken place in exactly thirty-two days; length 210 mm. An increase of 50 mm. from December 28 to January 29! The proportions of the tail also were changed considerably, a fin-like keel appearing dorsally which made the tail measure 15 mm. deep at a point 23 mm. distally of the cloaca from which point it narrowed gradually to the tip. The body measured 25 mm. at its widest part and most of the growth was apparently made distally of the 23 mm. point above alluded to, the specimen appearing to have a longer tail proportionally. The accompanying diagram depicts the proportions of the fin, it formerly being merely a slight ridge of practically equal height for the entire length of the tail. Cope* makes the following statement "The tail is long, exceeding

*Cope, E. D. The Batrachia of North America. Bull. U. S. Nat. Mus. No. 34, 1889, Washington. pp. 205-206.

the length of the head and body by the depth of the latter. It is very much compressed and has a wide dermal border both on the inferior and the superior edges. . . . The fin membrane of the edges of the tail is much reduced or is even wanting in the specimens with the rough skin." The writer's specimen has acquired this keel without developing concommittantly the other characters as described by Cope. In fact their correlation with this structure is rather questionable as in a previous place he, on page 205, connects the character of the skin with the environment alone.



Twenty-five minutes after the specimen was removed from its companions, they regained their composure and acted in their accustomed manner. A counting of heads showed that some were missing. They were at once checked and it was found that two large specimens of *S. salamandra* were gone. These specimens averaged about 130 mm. and as the terrarium was most securely covered, escape is out of the question. This forces one to the inference that the *torosus* did away with them. Then too it is strange that none of the other species were eaten as they were all of a smaller size than *S. salamandra.* Furthermore, it is to be noted that previously these salamanders were occasionally starved out for periods of similar lengths during which times no cannabalistic tendencies developed.

The thought that this unusual growth of *Notopthalmus torosus* is in some way connected with its feeding

on specimens of *Salamandra salamandra* only slightly inferior to itself in size seems unavoidable.—RUTH BERNICE BREDER, *Newark, N. J.*

CONCERNING THE QUESTION OF THE PRESENCE OF *EUMECES MARGINATUS* HALL IN RUSSIA

Elpatjewski and Labanejew[1] have pointed out that in the Zoological Museum of Moskow there are specimens of *Eumeces marginatus* Hall, procured in 1888 by Bourzew from the "Imperial port" and the bays of St. Olga and St. Voldemar. Nikolsky[2] doubts whether the determination of the species is right and supposes it to be *Eumeces latiscutatus* Hall. Having examined these specimens of the Zoological Museum of Moskow with great care and having compared them with the Japanese ones, I cannot but agree with his opinion; hence *Eumeces marginatus* Hall must be excluded from the list of Russian reptiles.—PAUL V. TERENTJEV, *Zool. Mus., Moskow, Russia.*

[1] Zool. Jahrb., Syst. v. XXIV, p. 255, pl. 18, fig. 3.
[2] "Faune de la Russie," Reptiles, v. I, 1915, p. 508.

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